4 Troubleshooting

Overview

This section is a loosely organized collection of fixes and workarounds to common problems that can be encountered when using Signalogic DSP Software and supported DSP/analog hardware. Each entry is presented as a problem description, followed by one or more suggestions for relief.

If you have read what there is to read, and then consulted this section, and your problem still doesn't go away, please try the following:

1. send e-mail to:

DSPhelp@signalogic.com

or

72113.1412@compuserve.com

2. send fax to 214-343-0163

3. if absolute urgency is required, contact Signalogic technical support at 214-343-0069

NOTE: Technical support calls to Signalogic 1-800 numbers will not be accepted.

Main Topics

Troubleshooting Installation Problems
Troubleshooting Video and Display Problems
Troubleshooting DSP/Analog Hardware Problems
I/O-Mapped Hardware Conflicts
Memory-Mapped Transfer Gotchas
Host PC Internal Bus Speed Conflicts

4.1 Troubleshooting Installation Problems

This section is a loosely organized collection of fixes and workarounds to common problems that can be encountered when installing Signalogic DSP Software. Each entry is presented as a problem description, followed by one or more suggestions to either correct the problem or workaround it.

Problem: during installation, I see a box saying "file to be installed is older than existing file; keep existing file?"

A dialog box with this message, and showing statistical data from two different files with the same filename is displayed during installation of a DSPower series software package.

Suggestion(s)

Keep the existing file. What has probably happened is a common library or DLL used by many software packages and needed by DSPower software, such as a Borland or Microsoft control library, already exists on your computer system. If such a case, this type of dialog box is displayed if the existing version is actually newer than the version the Signalogic Software Setup Utility is trying to install. This can happen if you have obtained a more recent copy of the common library by upgrading, buying a new system, etc.

Problem: when starting Windows on my system, I see a message "PIPE Virtual Device Driver, v3.07"

After installing DSPower-Block Diagram, or DSPower-HWLib, this message appears on your screen when first starting Windows.

Suggestion(s)

Ignore this message. Version 3.07 of the Pipe.386 virtual device driver (VxD) displays a sign-on message which has no effect. This VxD is used to allow DSPower-Block Diagram to communicate with Hypersignal packages running transparently in the background, and is installed during the normal course of DSPower-Block Diagram or DSPower-HWLib installation. For more information about Pipe.386 VxD, see Signalogic DSP Software System Guide section 1.1, Relationship of Signalogic DSP Software Components.

Problem: when running a DSPower-Block Diagram function, I get a message "DSP Engine not found", or similar

After clicking on the Run button inside a function or display block, or attempting to run a block diagram, a "DSP Engine not found" or "DSP Engine not invoked" message box appears, and the individual block or overall block diagram does not execute.

Suggestion(s)

There a number of ways this can happen:

1. The DSP Engine software was not installed correctly.

This is most likely to happen if Hypersignal was installed separately, not using the Signalogic Software Setup Utility. If Hypersignal has been installed separately (a process consisting mainly of copying *.* from distribution diskettes 1 and 2 to an "hsmacro" or "hsacous" subdirectory, and *.* from diskette 3 to an "hsacous\waveform" or "hsmacro\waveform" subdirectory), Hypersignal must be run at *least once* in stand-alone mode. This is necessary to expand several files distributed in compressed form on the Hypersignal distribution diskettes. This expansion occurs automatically if Hypersignal is installed using the Signalogic Software Setup Utility.

2. The DSP Engine path is not configured properly inside DSPower-Block Diagram. Ensure that under the DSPower-Block Diagram main menu selection "Configuration", and submenu selection "DSP Engines", that you have entered both a valid command line and run-

time source code path for any DSP Engine packages currently in use. The run-time source code path entry should contain a leading drive specifier, and no trailing backslash; for example:

..Engine Command Line **c:\hsmacro\hsmacro.exe**
Engine Run-Time Source Path **c:\hsmacro**

3. The version of DSP Engine software is not current. For example, you should have at least version 4.00xf or higher of Hypersignal-Macro, Hypersignal-Macro EX, or Hypersignal-Acoustic, version 5.00xf or higher of Hypersignal-Macro NRT, or version 4.00 or higher of MATLAB combined with version 3.0b or higher of the Signal Processing Toolbox. See section 1.3, System Requirements.

Problem: the DSPower-HWLib demo programs give a message "hardware not responding" and then fail to run

After clicking on the Digital Oscilloscope, Digital Tape Recorder, or other DSPower-HWLib demo icons from the Signalogic DSP Software group in Program Manager, a message box is displayed indicating "DSP hardware not responding" or "DSP hardware failed to initialize" or similar.

Suggestion(s)

Such a message probably means the DSP/analog hardware is not properly installed, or does not have a correct I/O base address or memory base address set in the Hardware Selector. Re-run the demo and double-check the address values in the Hardware Selector dialog box (lower right) vs. the jumper or switch settings on the DSP/analog hardware. If the demo program still does not run, there may be a more serious problem. See section 4.3, Troubleshooting DSP/Analog Hardware Problems, for more detailed information.

Problem: in my Hypersignal update (or upgrade), I only received diskettes 1/3 and 2/3. Why not diskette 3/3?

Assuming that you already had a copy of a Hypersignal-series software package, you may have received an update of a new version or upgrade to a more powerful package that did not include diskette #3 out of 3.

Suggestion(s)

This can occur because diskette #3 contains only waveform files, and typically does not change between version updates. It is also the same for all levels of Hypersignal-series packages. If you have received a Hypersignal package for the first time, you should definitely have received diskette #3.

Problem: after installing a Hypersignal-Macro series package, running the hs.bat, hsm.bat, or hsa.bat files doesn't work

This is most likely to occur when installing the Hypersignal software without using the Signalogic Software Setup utility. It is possible that the hsx.bat file failed to create a HSxxxxx.OVR file, when being run for the first time after installations, because the hsx.bat file failed to locate a copy of "EXPAND.EXE" on your system..

Suggestion(s)

After following the normal Hypersignal installation procedure outlined in section 3.2.5, Installing and Configuring Hypersignal Software For User Mode Operation, you should locate a copy of EXPAND.EXE on your system (Microsoft, version 2.0 or higher), select your subdirectory to wherever Hypersignal has been installed, and type:

```
X:\yyy\expand HSxxxxx.ov_ Hsxxxxx.ovr  <Enter>
```

at the DOS command line to expand the file, where X:\yyy is the location of EXPAND.EXE and xxxxx is macro, acous, macnrt, etc. depending on the type of Hypersignal-Macro series package being installed. EXPAND.EXE is shipped standard by Microsoft with MS-DOS versions 5.0 and higher.

The above procedure should also be followed on any files with .ex_ extension, that did not get expanded to their .exe equivalents; use a

```
dir *.ex_
```

command to check for any other unexpanded files.

NOTE: When installing a Hypersignal-Macro series package using the Signalogic software Setup Utility, compressed files are automatically expanded as they are copied from the distribution floppy diskettes to your hard disk.

4.2 Troubleshooting Video and Display Problems

This section is a loosely organized collection of fixes and workarounds to common problems associated with video drivers and display in both DOS and Windows 3.x. Although presented in the context of using Hypersignal-Macro series or DSPower series software, most of these problems are general to operation of any software in a DOS or Windows 3.x based system. Each entry is presented as a problem description, followed by one or more suggestions to either correct the problem or workaround it.

Problem: video display goes fuzzy

Video display goes "fuzzy" or loses sync when I run a Hypersignal package from Windows, and then return to Windows.

Suggestion(s)

1) Try installing the video driver supplied by the manufacturer of the your system's video hardware. The standard "SuperVGA" driver supplied with Windows is known to have this problem with some types of video hardware.

2) Try altering the settings in the hsa.pif or hsm.pif files, using the "PIF Editor" found in the Main group in Program Manager. Try adding the following settings, one by one:

- Video Memory: High Graphics
- Monitor Ports: High Graphics
- Retain Video Memory

Problem: Hypersignal display/instrument background not erased

When running Hypersignal from Windows icons or from a DOS prompt started from Windows, sometimes the screen background will not be fully erased in a display or instrument.

Suggestion(s)

Inside the Hypersignal-Macro series software display or instrument, try the 'Refresh' command (ctrl-L) from the keyboard. Versions 4.00bx and later of Hypersignal contain special "force clear" code for some graphics boards that have demonstrated this problem.

Problem: DSPower-Block Diagram objects too big

Your display is probably in 640x480 mode, and not enough screen resolution is available for default DSPower displays.

Suggestion(s)

1) Try setting the "Object Size Independent of Display Resolution" checkbox in the Worksheet Options menu. Note, however, that this option can make bitmaps appear "sketchy", or fuzzy, because the bitmap must be compressed to fit in a smaller area.

2) Try configuring your video board for 800x600 display by selecting the Windows Setup icon from the Main group in Program. Choose "Change System Settings" and look for a video driver option exactly the same as the one you are using, except with 800x600 resolution (i.e. same hardware name, same number of colors, same size font).

4.3 Troubleshooting DSP/Analog Hardware Problems

When using plug-in DSP/analog or acquisition hardware in a PC environment, there are some general areas which typically cause trouble:

1. The hardware uses only an I/O-mapped address, but seems to conflict with other hardware.
2. The hardware uses a memory-mapped addressing (data transfer) scheme, and seems to conflict with other hardware, already-installed software utilities, or the system itself.
3. PC bus speed (or internal system bus speed).
4. Problems during data acquisition or signal output.

4.3.1 I/O-Mapped Hardware Conflicts

The large majority of plug-in PC boards use an I/O-mapped address to enable software drivers to talk to them. The obvious problem is what happens when you get two or more boards, from different manufacturers, plugged into the same system--and they conflict, or occupy part of the same I/O-mapped address space.

After installing your DSP/analog hardware, here are some symptoms to look for if you suspect an I/O-mapped address conflict with other hardware:

- when being used in a software function, the DSP/analog hardware seems to run for a while and then freezes up, or gets through part of a function and then locks up
- data spikes or glitches are evident in digital oscilloscope or spectrum analyzer instrument displays
- another, unrelated board already in your system suddenly develops a problem
- otherwise strange or intermittent system behavior that was not present before installation of the DSP/analog hardware

If one of these symptoms occurs during check-out of your DSP/analog hardware, our best suggestion is to do as follows:

1. exit the software package, and exit Windows (if applicable)
2. "park" your hard disk (if applicable)
3. wait a few seconds to make sure all disk activity has ceased
4. turn the computer off
5. remove the DSP/analog hardware
6. change the DSP/analog hardware base I/O address by incrementing upwards at least 20H. This is typically accomplished using a bank of switches or set of jumpers on the board.
7. re-install the hardware, and try running software checks again

Why change the DSP/analog hardware base address, and not that of already installed board(s)? Generally, since DSP/analog hardware is intended for technical users in the first place, its documentation

explains clearly and forthrightly how to change base addresses. Whereas with consumer-oriented boards, even though changing the base address is (must be) possible, it's often hard to find in the documentation, or is not well-explained.

A smaller percentage of DSP/analog hardware also use memory-mapped addressing. For a thorough discussion of possible problems that can occur with such hardware, see section 4.3.2, Memory-Mapped Transfer Gotchas.

Related Troubleshooting Topics

Troubleshooting Installation Problems

Troubleshooting Video and Display Problems

Troubleshooting DSP/Analog Hardware Problems

I/O-Mapped Hardware Conflicts

Memory-Mapped Transfer Gotchas

Host PC Internal Bus Speed Conflicts

4.3.2 Memory-Mapped Transfer Gotchas

This section is only applicable if your DSP/analog hardware uses a memory-mapped transfer scheme (see individual hardware sections in Hypersignal-Macro Series Hardware Reference Guide, chapter 3, under "Digital Specifications".

Two 64 kbyte segments of the PC's "high memory", between 640k and 1024k, have traditionally been reserved for application-specific plug-in boards and/or memory-resident software utilities. The starting address for these segments is usually D000:0000H and E000:0000H. However, over time, such a plethora of boards and utilities have been created which require significant amounts of this limited resource, that conflicts can easily arise on any given PC. Most DSP board manufacturers try to avoid using memory-mapped schemes, to save themselves the technical support headaches, but the temptation of somewhat better performance (and sometimes easier design) is strong, and there are still boards out there which use this technique. If you have DSP/analog hardware which uses the memory-mapped transfer

mechanism, here are some symptoms to watch out for after installing the hardware:

- hardware seems to run for a while and then freezes up; hardware gets through part of a function and then locks up
- data spikes or glitches are displayed in functions like the digital oscilloscope or spectrum analyzer
- another, unrelated board or previously working software utility suddenly develops a problem
- otherwise strange or intermittent system behavior that was not present before installation of the DSP/analog hardware

If one of the above symptoms seems to be occurring, you may have encountered a memory-mapped gotcha. If so, here are some things you can check:

EMM386.EXE Considerations (Reserving Memory Areas)

The first thing you should be aware of is that if a line similar to

```
device = C:\DOS\HIMEM.SYS
```

or

```
device = C:\WINDOWS\HIMEM.SYS
```

appears in your CONFIG.SYS file, then any utility or program invoked afterwards could be loaded so as to conflict with memory needed by the DSP/analog hardware. This is because HIMEM.SYS makes it possible to load other programs in the high memory area mentioned above. If the HIMEM.SYS line is not present, you should add it. This line should appear before any other program or utility is invoked.

Look in your CONFIG.SYS file for an "EMM386" line. You may have something like

```
device = C:\WINDOWS\EMM386.EXE
```

or

```
device = C:\DOS\EMM386.EXE
```

followed by various memory usage specifications. The emm386 program controls PC access to high memory. It also controls access and usage of "expanded memory", which is an antiquated technique used for peripheral devices or software utilities which need a substantial amount of extra memory (i.e. more than .25 Mbyte). If this line is not in your CONFIG.SYS file, you should add it. Then, to reserve access to your memory-mapped DSP/analog hardware, try adding the following to this line:

```
X=AAAA-BBBB NOEMS
```

Only add "NOEMS" if not already there; it must be *after* the "X=" command. If you are adding the EMM386 line for the first time, put a space after EMM386.EXE. The "X=" command specifies a certain section of high memory be reserved. AAAA should be the starting address of the memory needed by your DSP/analog hardware, and BBBB the last address needed. Some examples (partial list only):

Table 1 Example CONFIG.SYS File EMM386 Line Entries

Hardware	EMM386 line addition
Ariel DSP-16	X=D000-DFFF
Ariel MP3210	X=DF00-DFFF
Innovative Integration PC31	X=DC00-DFFF
DSP Research TIGER 30	X=DC00-DFFF

See the individual hardware sections in the Hypersignal-Macro Series Hardware Reference Guide, chapter 3, for memory-mapped base addresses of DSP/analog hardware that use this technique. Note that the addressing modes required by individual hardware are listed in the "Digital Specifications" table in the section for that hardware, under "Host Data Transfer Method".

NOTES: It is important the "EMM386" line appear immediately after the HIMEM.SYS line. This will ensure that not only does EMM386.EXE prevent other programs from being loaded into the reserved area, but EMM386.EXE itself does not load into the reserved area.

"NOEMS" specifies no expanded memory; if you think your system is using expanded memory, then the situation is more complicated. This would be the case if the EMM386.EXE line is already in your

CONFIG.SYS file and it does not contain the NOEMS or X= commands. In this case, you should not add NOEMS to the EMM386.EXE line. You will need to figure out which segment of high memory your expanded memory is using, and set up the DSP/analog hardware to avoid this segment. For example, if your expanded memory is using segment D000:0000, then you should change the base address on your DSP/analog hardware from Dxxx to Exxx (leave the lower digits the same), and then add an X=Eaaa-Ebbb command to your EMM386.EXE line, following the guidelines explained above.

You can also add a "V" to the end of the EMM386.EXE line to cause the status and results of the emm386 program to be printed onscreen when your computer is booting up.

Related Memory-Mapped Transfer Topics

EMM386.EXE Considerations (Reserving Memory Areas)

EMMExclude Lines in Windows SYSTEM.INI File

Memory-Mapped Hardware Conflicts

Software Conflicts (Utilities, Memory-Resident Programs)

EMM386.EXE: Microsoft Knowledge Base Excerpts

EMMExclude Lines in Windows SYSTEM.INI File

Look in your SYSTEM.INI file (found on \WINDOWS\SYSTEM subdirectory) for "EMMExclude=" lines, located in the "[386Enh]" section of this file. If this section exists, you should add an EMMExclude lines which matches up with the EMM386 command you have entered in your CONFIG.SYS file. If, for example, your CONFIG.SYS file contains an "X=D000-DFFF" command, then you would add an "EMMExclude=D000-DFFF" line in the EMM section. (Actually, Microsoft documentation indicates that "X=" commands in the "EMM386" line take priority over EMMExclude lines in the SYSTEM.INI file, but we think it always a good idea to be extra safe with DOS-Windows interaction).

Related Memory-Mapped Transfer Topics

EMM386.EXE Considerations (Reserving Memory Areas)

EMMExclude Lines in Windows SYSTEM.INI File

Memory-Mapped Hardware Conflicts

Software Conflicts (Utilities, Memory-Resident Programs)

EMM386.EXE: Microsoft Knowledge Base Excerpts

Memory-Mapped Hardware Conflicts

Look for other boards in your system which may be using the same high memory segment. Typical culprits include network cards (which almost always require a small section of either the D000:0000 or E000:0000 segments), some high-performance video cards, other DSP/analog boards or sound boards (of course!), and non-standard peripheral cards (anything off the beaten track). If you find one, first simply try removing it before doing anything else. If the DSP/analog hardware problems clear up, then one of the contenders will need to have its base memory address changed. If you change the DSP/analog hardware base address, be sure to inform the Hypersignal System Config menu, or the DSPower-Block Diagram DSP/Analog Hardware Configuration dialog box (see individual hardware sections in Hypersignal-Macro Series Hardware Reference Guide, chapter 3).

Related Memory-Mapped Transfer Topics

EMM386.EXE Considerations (Reserving Memory Areas)

EMMExclude Lines in Windows SYSTEM.INI File

Memory-Mapped Hardware Conflicts

Software Conflicts (Utilities, Memory-Resident Programs)

EMM386.EXE: Microsoft Knowledge Base Excerpts

Software Conflicts (Utilities, Memory-Resident Programs)

Look for software utilities or memory-resident programs which might be using high memory. You can do this by using the "mem" or "mem /s" commands from the DOS command line. Occasionally, such programs can be so ill-behaved they even use areas reserved by the EMM386.EXE program (see above). In such cases, you have no choice but to temporarily "REM-out" these utilities one-by-one from your CONFIG.SYS or AUTOEXEC.BAT files until you find out what is causing the problem. Sometimes, you can simply change the order in which these utilities are invoked to make a problem go away--loading ill-behaved programs later increases the chance hey will use areas reserved by EMM386.EXE, since other (well-behaved) programs have loaded themselves with due respect to areas reserved by EMM386.EXE.

NOTE: Changing the order of utilities and programs in your CONFIG.SYS and AUTOEXEC.BAT files can be a risky business. Change the order only of those suspected of causing problems. These should not be well known utilities such as SMARTDRV.EXE, SHARE.EXE, DOSKEY.EXE, DOSSHELL.EXE, HIMEM.SYS, ANSI.SYS, etc.; they are much more likely to be programs supplied by third-party manufacturers, or having to do in some way with peripheral cards you have added to your system.

Related Memory-Mapped Transfer Topics

EMM386.EXE Considerations (Reserving Memory Areas)

EMMExclude Lines in Windows SYSTEM.INI File

Memory-Mapped Hardware Conflicts

Software Conflicts (Utilities, Memory-Resident Programs)

EMM386.EXE: Microsoft Knowledge Base Excerpts

EMM386.EXE: Microsoft Knowledge Base Excerpts

Below are some excerpts from files gathered from the Microsoft Knowledge Base on the CompuServe network (all excerpts COPYRIGHT MICROSOFT 1994). These files should indicate the same information as presented above, but we've included them because they offer some extra detail which could prove useful in certain situations.

EMM386 Troubleshooting and Technical Information

Copyright Microsoft, 1994
Title: EMM386 Troubleshooting and Technical Information
Document Number: Q78557
Pubication Date: 17-SEP-1994
Product Name: Microsoft Disk Operating System
Product Version: 5.00 5.00a 6.00 6.20 6.21 6.22
Operating System: MS-DOS

If EMM386.EXE locks up the computer, follow these troubleshooting steps:

1. If the DEVICE=EMM386.EXE in the CONFIG.SYS file contains the HIGHSCAN parameter, remove HIGHSCAN from the command, save the CONFIG.SYS file, and restart your computer. (HIGHSCAN cannot be used on some computers.)
2. Start EMM386.EXE with the exclude option.

EMM386.EXE may have incorrectly identified an area being used by the system as a "hole" (a region that can be used as a UMB or an EMS page frame). As a result, EMM386.EXE overwrites a portion of memory being used by a hardware adapter in your computer.

By excluding addresses in the range A000-EFFF, EMM386.EXE does not use any part of the excluded region for a UMB or EMS page frame. Identifying the correct region(s) to exclude requires experimentation. Start by excluding a large region and then reducing the size of the region. For example:

```
DEVICE=EMM386.EXE NOEMS X=A000-EFFF
DEVICE=EMM386.EXE NOEMS X=C000-DFFF
DEVICE=EMM386.EXE NOEMS X=C800-CFFF
```

You can use multiple exclusions on the EMM386.EXE device line. For example:

DEVICE=EMM386.EXE NOEMS X=C000-C7FF X=E000-EFFF

Refer to the documentation included with your hardware device(s) for information on the upper memory addresses the adapter card uses. Examples of devices which use upper memory addresses include network cards, SCSI adapters, video cards, and scanners.

How EMM386 and Windows 3.1 Relate (Include/Exclude Precedence)

Copyright Microsoft 1994
Title: How EMM386 and Windows 3.1 Relate
Document Number: Q82711
Pubication Date: 13-OCT-1994
Product Name: Microsoft Windows 3.x Retail Product
Product Version: 3.10 3.11
Operating System: WINDOWS

An X= parameter added to the EMM386.EXE device line is directly adopted by Windows. Any EMMInclude= or EMMExclude= entry is overridden by any X= parameter on the EMM386.EXE device line in the CONFIG.SYS file.

For example, the following line in your CONFIG.SYS takes precedence over any conflicting entry:

```
device=c:\windows\EMM386.EXE X=C000-CFFF noems
```

When Windows executes, it takes this information before it checks the SYSTEM.INI file. Even if the SYSTEM.INI file contains a contradictory line, for example:

```
EMMInclude=C000-CFFF
```

Windows keeps the EMM386.EXE parameter.

How to Troubleshoot Hardware Conflicts

Copyright Microsoft 1994
Title: How to Troubleshoot Hardware Conflicts
Document Number: Q90245
Pubication Date: 11-OCT-1994
Product Name: Microsoft Windows 3.x Retail Product
Product Version: 3.10
Operating System: WINDOWS

Hardware conflicts are difficult to diagnose because they manifest themselves in different ways depending on the type of network card and what they are conflicting with (disk driver, sound board, and so on). Typical hardware symptoms include:

1. Failure of the network card device driver to load; Error 5733 when the NET START command is used, or the network card fails to bind.
2. Inconsistent network behavior; the system stops responding (hangs) sometimes, or errors occur copying large files over the network.
3. Error 53: trying to connect to servers. (You cannot see anything on the network.)

If you suspect some type of conflict, try one of the following:

- Switch the network card to a different interrupt.
- Check for memory conflicts between the network card and other devices in the system. Some network cards use an of upper memory. If the area of memory, the card used is configurable. See the documentation for the network card. You can determine which parts of upper memory are being used by other devices by doing the following:

1. Remove the network drivers and EMM386.EXE from CONFIG.SYS file.
2. Restart the computer.
3. Run Microsoft Diagnostics (MSD.EXE).
4. Look at the memory map. It should show any upper memory being used. If the net card is trying to use the same area as another device, reconfigure the network card to use a different memory area.

- Make sure the memory range for the network card (if it uses one) is excluded with EMM386.EXE if it is being used, or in the [386Enh] section of SYSTEM.INI file if EMM386.EXE in not being used.

4.3.3 Host PC Internal Bus Speed Conflicts

Strictly speaking, DSP/analog hardware is not expected to operate in a host PC with internal bus speed greater than 8.33 MHz, which was the original IBM-AT standard. However, over time, a situation has evolved where many boards of different types can operate at higher bus speeds to provide better performance. And so, computer manufacturers have offered BIOS firmware options or motherboard switches which allow different internal bus speeds to be selected. Typically, one can select an internal bus speed that is the result of dividing the master PC clock speed by some integer. For example, on a 66 MHz 486 machine, options may be available for 13.2, 11, 9.43, and 8.25 MHz bus speeds. Often times, a machine has been configured by the manufacturer or system integrator to utilize hard disk controller, video card, etc. which can accept a higher speed, in order to provide better performance when delivered to the customer. Unfortunately, not all DSP/analog boards can tolerate increases above the 8.33 MHz mark. Cases where testing at Signalogic has shown this to be the case are indicated as highlighted notes in the individual hardware sections in chapter 3 of the Hypersignal-Macro Series Hardware Reference Guide. In such cases, you may need to run the BIOS configuration or setup program and look for an option to reduce the host PC internal bus speed.

Related Troubleshooting Topics

Troubleshooting Installation Problems

Troubleshooting Video and Display Problems

Troubleshooting DSP/Analog Hardware Problems

I/O-Mapped Hardware Conflicts

Memory-Mapped Transfer Gotchas

Host PC Internal Bus Speed Conflicts

4.3.4 Data Acquisition Problems

This covers some typical problem areas that can occur during the course of using DSP/analog hardware. These are not installation or system conflict problems, which are covered in sections 4.3.1 through 4.3.3 above, I/O-Mapped Hardware Conflicts, Memory-Mapped Transfer Gotchas, and Host PC Internal Bus Speed Conflicts.

DC Offsets

DC offsets can be a minor but annoying problem. In some cases, they might be severe enough to subtract a significant amount of dynamic range from an A/D converter. Here are some things that might be done about it:

1. See if the DSP/analog hardware in use has a programmable "coupling" option; if so, choose AC coupling. Sometimes the coupling option is on a per-channel basis, and sometimes on an overall basis. Most DSP/analog hardware is fixed with DC-coupled, and cannot be programmed.
2. See if the DSP/analog hardware has trim-pot adjustments, which can be used to control the dc offset of input amplifiers before the signal reaches the A/D converters.
3. If the offset is causing an artificial noise floor reading in a Spectrum Analyzer instrument display or other Fourier analysis function, try using no windowing and no zerofill in the FFT. The presence of any dc offset will cause a window to contribute its frequency characteristics to an FFT response.
4. Experiment with subtracting the offset digitally when recording analog data to hard disk or performing stimulus & response measurements. For example, the Hypersignal-Macro series software packages have "Input/Output Offset" fields which can be entered to non-zero values for offset control. Remember, though, in this case the offset is merely being compensated for, and not removed, from the analog I/O system. If a full dynamic range signal has already clipped due to an offset problem, attempting to remove the offset digitally will be futile.

Related Data Acquisition Problem Topics

Continuous Disk Transfer Performance

One of the most common areas of concern when using DSP/analog hardware is maximum transfer rates to and from hard disk. To achieve maximum performance, here are some pointers and suggestions:

1. A fast system. Nothing helps like raw talent. A fast processor (for example, a 66 MHz 486 or better), a fast hard disk, preferably with its controller card located on a VESA local bus or PCI bus, video controller card located on a VESA local bus or PCI bus, and an internal bus speed of at least 8.33 MHz, and possibly higher, will make a big difference. Locating the hard disk controller and video controller cards on a local bus is important, because the DSP/analog hardware should then have exclusive use of the standard ISA bus during acquisition (99% of off-the-shelf DSP/analog hardware are ISA bus plug-in cards).

2. Some network adapter cards and other peripheral cards can actually slow down a host PC's internal bus (ISA bus) to rates as low as 4.77 MHz because of the way they respond to bus acknowledgment signals. If you suspect your DSP/analog hardware disk performance is too slow, you might try temporarily taking out all other peripheral boards in your system, and re-measuring.

3. Make sure your available hard disk space is not fragmented. Non-contiguous file space can cause delays in continuous acquisition to disk, which could translate into gaps in the data. You can use an application like Norton Desktop to periodically run a disk-defragmentation utility, say once a week. This should ensure large chunks of free, contiguous disk space at any given time. Also, if the software being used allows it, you might try increasing the number of buffers being used; more buffers act as a greater "shock absorber" for delays caused by non-contiguous file space or bad-tracks.

4. ***Do not use disk space compression***; e.g. DoubleSpace, Stacker, etc. These utilities take extra time to compress data before it is actually stored to disk. Normally, this time is not noticed because a

big memory cache is enabled for the system's disk I/O, and data is written first to the cache, allowing programs to think the transfer is complete. But, when long data acquisition operations take place, the cache quickly gets full, and data must then be stored to disk at the same rate as it is coming in. At this point, the performance degradation of a compression utility will be quite noticeable.

5. For some systems, continuous disk transfer performance is actually increased if 32-bit disk access is disabled. This option is located under Program Manager | Main | 386 Enhanced | Virtual Memory.

6. For some systems, continuous disk transfer performance is actually increased if the SMARTDRV.EXE utility is not loaded. This option is usually specified inside the system's AUTOEXEC.BAT file, and sometimes in its CONFIG.SYS file (in the form "device = C:\WINDOWS\SMARTDRV.EXE" or similar). The reason? Because long, continuous disk acquisition operations at high sampling rates eventually fill up the internal memory cache used by SMARTDRV.EXE; afterwards, the advantages of caching are lost as data must leave the cache at same rate it enters. At this point, the overhead of cache processing does not contribute to disk performance, and may detract. Note, however, that disabling SMARTDRV.EXE will have a detrimental effect on the performance of your system overall, especially for word processing, database, communications, and other applications that make extensive random file accesses. If disabling SMARTDRV.EXE turns out to be necessary for the DSP/analog hardware in your system to achieve continuous acquisition at a certain required maximum sampling rate, you should wrap the disabling into a macro program or DSP engine function, so that it can be disabled and re-enabled automatically.

7. You can use the "sliding window" FFT technique to check for discontinuous data in a recorded waveform file that you suspect as possibly having gaps. To do this, perform an FFT function (in Hypersignal-Macro series software, use FFT Generation, in DSPower-Block Diagram use the FFTEx function) with the following parameters:

   Framesize of 250
   FFT size of 512 (FFT order = 9)
   Overlap of 50%
   Hamming Window

This will cause the input waveform to be analyzed with a sliding window that will highlight sharp transitions such as likely to be associated with a discontinuity. Showing the results in the 2-D spectrograph (contour) display function; can do two things: 1) display the entire waveform at once, and 2) allow a "look down" into the frequency data from 0 to -70 dB or -80 dB. If there are gaps in the data they should show up as one or more brightly colored vertical lines, and possibly evenly and/or repetitively spaced. The vertical line occurs because the discontinuity is seen by the FFT analysis as wideband noise; the even and/or repetitive spacing--if present--may represent the internal buffer size used by the acquisition operation.

Related Data Acquisition Problem Topics

DC Offsets

Continuous Disk Transfer Performance

Notes: